

- d) an array of tapered optical waveguides positioned between the substrate and the means for directing light, each tapered optical waveguide comprising:
- an input surface that admits light;
 - an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and
 - a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

The features of the claimed structure are shown as a combination of Figs. 1-3 and 16. Figure 1 shows a transparent or translucent substrate 10; a layer of photopolymerizable material 10; and means for directing collimated or nearly-collimated light through the substrate and into the photopolymerizable material (Light arrows). The specification description of Fig. 16 indicates that “An arrangement combining a diffuser utilizing one of the structures of FIGS. 3 and 6-10 with an array of tapered optical waveguides is shown in FIG. 16. Light first enters an array 420 of tapered optical waveguides 422 and then passes through a diffusing structure 430.....”. A description of the tapered waveguide appears throughout the specification, in particular “FIGS. 14 and 15 are perspective and elevation views, respectively, of an array 400 of tapered optical waveguides where each waveguide has a square cross-section. Each tapered optical waveguide 402 has an input surface 404, an output surface 406 having an area less than the input surface 404, and sidewalls 408. The structure a), b), c) d) above is the structure of claim 22, et seq. The preamble is merely a statement of usefulness where the structure of claim 22 can itself be used to further manufacturing another light diffusing structure, much in the way that machine tools can be used to make other machine tools. The concept of making another light diffusing structure using the claimed apparatus is discussed under the specification heading “Replication of the Photocrosslinked Layer”. It is submitted that a sufficiently enabling disclosure has been provided for claims 22-33, 35-38, 42, 57-63 and 65-67.

It should be noted that the CCPA has held that the disclosure of invention set forth by an applicant in his application must be given the *presumption of correctness and*

operativeness by the PTO and that the only relevant concern of the PTO under the circumstances should concern the *truth* of the assertions contained in the application:

"As a matter of Patent Office practice, then, a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enabling requirement of the first paragraph of §112 unless there is reason to doubt the objective truth of the statement contained therein which must be relied on for enabling support ... In any event, it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go to the trouble and expense of supporting his presumptively accurate disclosure". In *re Marzocchi*, 439 F.2d 220, 169 USPQ 367 (CCPA 1967). See also in *re Bowen*, 492 F.2d 859, 181 USPQ 48 (CCPA 1974).

For these reasons, it is submitted that a sufficiently enabling disclosure has been provided for claims 22-33, 35-38, 42, 57-63 and 65-67, and the rejection under 35 U.S.C. 112 as failing to comply with the enablement requirement should be withdrawn.

Claims 22-33, 35-38, 42, 57-63 and 65-67 stand rejected under 35 U.S.C. 112 as failing to comply with the written description requirement. It is respectfully submitted that this ground of rejection is not well taken. All of the above arguments are repeated and likely apply to this ground of rejection. A sufficient written description has been provided at the locations discussed above. The original claims included claims directed to a product. These were then subjected to a restriction requirement. In this regard, related patents 6,010,747 and 6,261,664 have been granted. A form of the product, namely a diffuser product, can then be used in an overall apparatus to further provide replicate diffuser products. The fact that diffuser product claims have been presented does not disqualify apparatus claims. In this regard, original claim 13 is not currently pending and should not concern the examiner. The provision of a nexus between the elements is clearly understandable upon a reading of claim 22 and a review of Figs. 1-3 and 16. The

waveguides are both a part of one form of a product, and also a part of an apparatus for producing more product. The provision of a product description does not contradict an apparatus description as stated above and as appears in the specification. For these reasons, it is submitted that a sufficiently enabling disclosure has been provided for claims 22-33, 35-38, 42, 57-63 and 65-67, and the rejection under 35 U.S.C. 112 as failing to comply with the written description requirement should be withdrawn.

In paragraph 5 of the Office Action, the examiner discusses means plus function claim language in claims 22 and 37. The undersigned does not see a ground of rejection in this paragraph. Should the examiner assert that there is a ground of rejection intended, he is requested to clarify the same and specifically state a ground of rejection in a subsequent office action so that the issue can be properly addressed.

Claims 22-30, 35, 36, and 42 stand rejected under 35 U.S.C. 103 as being unpatentable over Takahashi in view of Rendulic. Applicants respectfully submit that this ground of rejection is not well taken.

The present invention relates to an apparatus for manufacturing a light diffusing structure, comprising: a transparent or translucent substrate; a layer of photopolymerizable material; and means for directing collimated or nearly-collimated light through the substrate and into the photopolymerizable material for a period of time sufficient to photopolymerize only a portion of the photopolymerizable material; and an array of tapered optical waveguides, each tapered optical waveguide comprising: an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

The examiner is of the position that Takahashi teaches all but a few key features of the present invention. Applicants submit that this is not the case. Takahashi relates to the

formation of photosensitive resin compositions for the production of relief printing plates. Applicants urge that one skilled in the art would not look to Takahashi, a reference relating to the formation of photosensitive resins for relief printing plates, in an effort to devise the presently claimed invention, relating to optical light diffusers.

While Takahashi does indeed teach the curing of a resin composition on a glass plate, it fails to teach the *structure* of the presently claimed invention. The present invention teaches an apparatus for manufacturing a *light diffusing structure* wherein only a portion of the photopolymerizable material is polymerized. Thus, a non-uniform photopolymerized layer is formed, which thereby causes the diffusion of light when directing light onto the layer. Takahashi does not teach a light diffusing structure, but rather a structure having a masked and exposed resin pattern formed thereon. Takahashi states in col. 15, line 66 through col. 16 line 2, that their structure serves to “produce a printing plate having uniform thickness and which is *free from dents and bumps*.” It is further urged that nowhere does Takahashi even mention the words “diffuse” or “diffusion”. It is respectfully urged that the structure taught by Takahashi would *not* serve as a light diffuser, and that Takahashi thus teaches away from the presently claimed invention.

The examiner concedes that Takahashi fails to teach several key features of the present claims. For example, Takahashi fails to teach a collimated light source. Takahashi further fails to teach tapered optical waveguides. Printing plates, which are opaque, have nothing to do with an apparatus having a transparent or translucent substrate.

The examiner thus cites Rendulic in an effort to fill these deficiencies of Takahashi. Applicants respectfully submit that such a combination is flawed. Rendulic relates to printed circuit boards. More particularly, it teaches a printed circuit board having polymers coated and cured thereon. Indeed, Rendulic teaches the use of a collimated light. However, their teachings relate to the formation of printed circuit boards on circuit board substrates. Rendulic does not disclose the use of a transparent or translucent

substrate, and, in fact, nowhere does Rendulic even mention the words “diffuse” or “diffusion”.

It is urged that the combination of Takahashi and Rendulic still fails to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source. Each tapered optical waveguide of the claims comprises an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface. Such is not taught by Takahashi or Rendulic. Citing references that merely indicate that isolated elements recited in the claims are known is not a sufficient basis for a conclusion of obviousness; there must be something that suggests the desirability of combining the references in a manner calculated to arrive at the claimed invention. Ex parte Hiyamizu, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988). Neither Takahashi nor Rendulic discuss to light diffusion, or even mention the words “diffuse” or “diffusion”. Applicants submit that the Examiner has failed to show any suggestion or motivation in the art to combine the teachings of Takashashi and Rendulic with the Beeson reference, which exists in a very different field of art. It is therefore respectfully urged that the 35 U.S.C. 103 rejection is improper and should be withdrawn.

(b) The Examiner rejects claims 57-63 and 67 under 35 U.S.C. 103 as being unpatentable over Takahashi in view of Rendulic. Applicants respectfully urge that this ground of rejection is not well taken.

The embodiment of these claims involves an apparatus for manufacturing a light diffusing structure, comprising a metallic layer formed on a layer of photopolymerizable material which photopolymerizable material is positioned on a transparent or translucent substrate and exposed to a source of collimated or nearly-collimated light first directed through the transparent or translucent substrate for a period of time sufficient to

photopolymerize only a portion of the photopolymerizable material after the unphotopolymerized portion of the photopolymerizable portion has been removed; and an array of tapered optical waveguides positioned between the substrate and the light source. Each tapered optical waveguide comprises an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

As stated above, the Examiner is correct that Takahashi teaches *some* features of the present claims. However, as the Examiner concedes, Takahashi fails to teach or suggest several features of the present claims. Takahashi fails to teach a collimated light source, a means for directing light generates light having a divergence angle of less than ten degrees, or an embodiment wherein the means for directing light directs the light through the substrate in more than one dose. Thus, the Examiner cites Rendulic in an effort to fill these deficiencies of Takahashi. Indeed Rendulic teaches the use of a collimated light source with an angle of deviation between 3 and 1.5 degrees. However, as stated above, the combination of Takahashi and Rendulic still fails to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source. Neither Takahashi nor Rendulic discuss to light diffusion, or even mention the words “diffuse” or “diffusion”. Takahashi relates to relief printing plates, and Rendulic relates to printed circuit boards. In contrast, this application relates to an apparatus, which is not within the same field of art as the cited references, at least because a transparent or translucent substrate is required.

Applicants urge that there is nothing in the cited art which would motivate one skilled in the art to combine the teachings of Takashashi and Rendulic. These cited references are in different fields of art, and it is submitted that there is no teaching or suggestion in either of these references which would lead one skilled in the art to combine Takahashi and Rendulic in an effort to devise the light diffusing structure of the presently claimed

invention. A reference has to offer sufficient motivation for one skilled in the art to achieve the desired result. In the instant case, the motives in the references, as disclosed by the practices therein, are quite different from each other and from those in the instant invention. Neither reference suggests a photopolymerized portion having a surface having smooth bumps ranging from about 1 micron to about 20 microns in both height and width. In this regard, the examiner merely overlooks these claims limitations and concludes that such would be obvious to one skilled in the art without prior art support for these opinions. Applicants therefore submit that the present invention is not made obvious by the combination the Examiner has suggested, and the 35 U.S.C. 103 rejection should be withdrawn.

The Examiner rejects claim 64 under 35 U.S.C. 103 as being unpatentable over Jarsen.

Claim 64 requires:

A mold for manufacturing a light diffusing structure, comprising a metallic layer formed on a layer of photopolymerizable material which is positioned on a transparent or translucent substrate, said photopolymerizable material comprising at least one photopolymerizable monomer or oligomer, a photoinitiator and a photoinhibitor, which photopolymerizable material has been exposed to a source of collimated or nearly-collimated light first directed through the transparent or translucent substrate, the substrate being fabricated from a material from one or more of the classes of (a) amorphous materials; (b) semi-crystalline materials that contain crystalline domains interspersed in an amorphous matrix; and (c) purely crystalline materials, for a period of time sufficient to photopolymerize only a portion of the photopolymerizable material after the unphotopolymerized portion of the photopolymerizable portion has been removed; and wherein said photopolymerized portion has a surface having smooth bumps ranging from about 1 micron to about 20 microns in both height and width.

None of these required features are found in Jarsen. While Jarsen teaches a mold for creating bumps on a resin surface prior to curing, it is urged that the subject matter of Jarsen *does not apply to the technical field of this invention*. Jarsen relates to a matrix used to prepare a mold of elastomeric material, for forming articles such as the information layer of a video disc. In contrast, the present invention relates to light diffusing structures including tapered optical waveguides, for use as a component of an

LCD display system. Furthermore, the bumps described according to Jarsen are “information bumps” on a surface of a video disc, are described as having a size which is 0.7µm in height and 1µm in width. This actually *teaches away* from the present invention which requires 1-20 microns in both height and width. The examiner states that it would have been obvious for one skilled in the art to modify Jarsen to change the size and depth to those ranges of the present claims. However, it is urged that an invention cannot be deemed unpatentable merely because, in a hindsight attempt to reconstruct the invention, one can find elements of it in the art; it must be shown that the invention as a whole was obvious at the time the invention was made without knowledge of the claimed invention. 35 U.S.C. 103. The Examiner appears to be going to great lengths to locate and try to interrelate references involving separate features of the present invention, but no matter how one applies or combines these references they do not disclose the presently claimed invention or its attained the demonstrated benefits. When selective combination of prior art references is needed to make an invention seem obvious, there must be something in the art to suggest that particular combination other than hindsight gleaned from the invention itself, something to suggest the desirability of the combination. Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434, 1438 (CAFC 1988). Such a suggestion is absent in the cited references. Thus, it is respectfully urged that the 35 U.S.C. 103 rejection over Jarsen be withdrawn.

The Examiner has rejected claims 22-30, 35, 36, 42 and 65-66 under 35 U.S.C. 103 as being unpatentable over Matsumara, et al in view of Rendulic, et al. Applicants respectfully submit that this ground of rejection is not well taken. Matsumura relates to a process for producing a multicolor display. The Examiner is correct that Matsumura teaches several features of the present claims, yet fails to teach a collimated light source, an angle of divergence of less than 10 degrees, providing light in more than one dose, and an array of optical waveguides, nor lenticular elements juxtaposed with polymerizable materials.

The Examiner thus cites Rendulic in an effort to fill the deficiencies of Matsumara, et al.

The examiner is correct that Rendulic teaches the use of a collimated light source with an angle of deviation between 3 and 1.5 degrees. However, it is urged that one skilled in the art would not combine Rendulic, which relates to printed circuit boards, with Matsumura, which relates to multicolor displays. These cited references are in different fields of art, and it is submitted that there is no teaching or suggestion in either of these references which would lead one skilled in the art to combine Matsumura and Rendulic in an effort to devise presently claimed invention.

Furthermore, a combination of Matsumura and Rendulic would still fail to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source. Each tapered optical waveguide comprises an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

Citing references that merely indicate that isolated elements recited in the claims are known is not a sufficient basis for a conclusion of obviousness; there must be something that suggests the desirability of combining the references in a manner calculated to arrive at the claimed invention. Ex parte Hiyamizu, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988). Applicants submit that the Examiner has failed to show any suggestion or motivation in the art to combine the teachings of Matsumura and Rendulic. It is therefore urged that the present invention is not made obvious by the combination of Matsumura et al., and Rendulic et al, and the 35 U.S.C. 103 rejection should be withdrawn.

Claims 31-33, 37-41 and 65 have been rejected under 35 U.S.C. 103 as being unpatentable over Matsumura in view of Rendulic, and in further view of Jarson. The arguments over Matsumura et al, Rendulic et al., and Jarsen are repeated from above and apply equally here. Matsumura relates to a process for producing a multicolor

display. The Examiner is correct that Matsumura teaches several features of the present claims, yet fails to teach a collimated light source, an angle of divergence of less than 10 degrees, providing light in more than one dose, and an array of optical waveguides, nor lenticular elements juxtaposed with polymerizable materials. The examiner is correct that Rendulic teaches the use of a collimated light source with an angle of deviation between 3 and 1.5 degrees. However, it is urged that one skilled in the art would not combine Rendulic, which relates to printed circuit boards, with Matsumura, which relates to multicolor displays. These cited references are in different fields of art, and it is submitted that there is no teaching or suggestion in either of these references which would lead one skilled in the art to combine Matsumura and Rendulic in an effort to devise presently claimed invention. Furthermore, a combination of Matsumura and Rendulic would still fail to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source. Each tapered optical waveguide comprises an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface. Jarsen teaches a mold for creating bumps on a resin surface prior to curing, it is urged that the subject matter of Jarsen *does not apply to the technical field of this invention*. Jarsen relates to a matrix used to prepare a mold of elastomeric material, for forming articles such as the information layer of a video disc. In contrast, the present invention relates to light diffusing structures including tapered optical waveguides, for use as a component of an LCD display system. Furthermore, the bumps described according to Jarsen are "information bumps" on a surface of a video disc, are described as having a size which is 0.7 μ m in height and 1 μ m in width. This actually *teaches away* from the present invention which requires 1-20 microns in both height and width. Furthermore, a combination of Matsumura in view of Rendulic, and in further view of Jarson would still fail to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source. It is therefore respectfully urged that the 35 U.S.C. 103 rejection is improper and should be withdrawn.

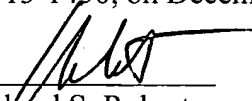
None of the cited references, taken alone or in combination, teaches or suggests the invention claimed by Applicants. The examiner has selectively extracted and extrapolated bits and pieces from the art and reconstructed the art in light of applicant's disclosure, and yet still fails to hypothetically find the invention. For all the above reasons, claims 22-30, 35-38, 42, and 57-67 are urged to be patentable over the cited references, and the rejections under 35 U.S.C.103 should be withdrawn.

Respectfully submitted,



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